

THE SCOPE

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THE SCOPE



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THE SCOPE

Presents

TRANSITORY REFRACTIVE CHANGES

by John E. Asarkoff, O. D.

Boston, Mass.

Refractive changes of sudden origin have been reported infrequently in the optometric literature. Many of these cases undoubtedly come under the observation of optometrists as the complaints are not necessarily of pain or of red eyes, but of occasionally an improvement, or more commonly a diminution in vision ranging from a slight blurring to a marked loss of vision. Therefore, the optometrist should be familiar with all conditions both primary in the eye or affecting the eye secondarily, which may cause these refractive changes.

Many pathologic conditions of the eye such as: glaucoma, incipient cataract, especially the nuclear type, kerato-conus, and diabetes mellitus change the static refraction of the eye, while conditions such as paralyzes or spasm of the ciliary muscle affect the dynamic refraction of the eye.

It is of interest to note that temporary changes in refraction have been observed by Schieck¹ and Terrien² in severe diarrhea, by Jensen³ on a reducing diet in a cardiac patient with edema, Thorson,⁴ reported the onset of myopia in a hypertensive non-diabetic, following the Sippy treatment for gastric ulcer. Gallus,⁵ reports two cases of transitory hyperopia, both non-diabetic, one had liver disease and the other a severe degree of tuberculosis.

Paralysis of accommodation is most frequently caused by some form of toxin or poison, or by trauma. One of the most common causes is diphtheria. The post

diphtheritic type occurs during convalescence from diphtheria and as loss of accommodative power may not be apparent until several weeks after the original illness, the latter may have been forgotten. This paralysis of the ciliary muscle is often accompanied by pharyngeal paralysis involving speech and swallowing.

Spasm of the ciliary muscle, which is sometimes met with in iritis, causes a sudden myopia—the spasm being due to the irritant effects of the inflammatory products.

The refraction of the eye may be changed by the increase in the intra-ocular pressure in glaucoma, due to a forward displacement of the lens and a probable change in the index of refraction of some of the ocular media. The tendency is toward an increase in the hyperopia. Very interesting is the reverse trend after successful use of miotics, which is followed by a marked increase in myopia. This is due to a pseudo cramp of accommodation from the influence of the miotic upon the ciliary muscle. A much more significant happening in glaucoma is a loss of accommodation, and this, occurring in an adult about middle life and after, makes itself evident as an early commencement of a rapid progression of presbyopia. The condition appears to be due to a pressure atrophy of the ciliary muscle.

Immature cataract, particularly the nuclear type, causes a gradual myopic change.

It is due to the increase in the optical density of the lens which occurs in this disease, and is most evident when the nuclear parts are particularly involved. This change has been reported to go as high as twenty diopters or more of myopia.

The most interesting and dramatic change in refraction occur, however, in diabetes mellitus. Horner,⁶ in 1873, first reported the transitory refractive changes of diabetes, changes which have been thoroughly reviewed with complete bibliography by Granström.⁷

Transitory refractive changes may occur in untreated cases of diabetes or in cases just started on treatment by diet or diet with insulin. It may vary from slight change in the eyesight to almost complete blindness. Fortunately, it is transitory and does not leave any residual effects.

Diabetic patients who experience visual disturbances usually present three characteristic histories. In one case, a person with an apparently normal vision suddenly or within a few days develops poor distance or near vision, simultaneously with a number of symptoms and findings characteristic of diabetes mellitus, or at times without any symptoms of diabetes. In the second case, a person who has known that he had diabetes and had good vision notices a change in his distance vision, near vision, or both soon after the treatment for his diabetes is instituted. The third, more common case, usually complains of blurring and difficulty in near vision. This disturbance may appear either before or soon after treatment for diabetes is started and may vary in degree from day to day. It eventually clears up with the continued treatment of the diabetes. Examination of the eyes will show a myopic change in the first case, hyperopic in the second case, and in the third case no change in the refraction is found. The disturbance may be due to a weakness in accommodation or to some other factor.

Although refractive changes, especially hyperopia, are very common following

treatment in acute diabetes, Granström's studies have shown that subjective symptoms are present in only about 50% of the cases. In some cases, especially in those below the age of thirty, a diminution in the accommodation was observed in the myopic as well as in the hyperopic state. In many cases reported in the literature in detail, the subjective symptoms not only were at times absent in the presence of a change in the refraction or accommodation, but the degree of subjective impairment of the vision did not correspond to the degree of increase or decrease in the refraction or accommodation. When the subjective symptoms do accompany the refractive change, they disappear long before the refraction is stabilized. The above-mentioned disturbance in vision in diabetics can be attributed to three factors which may occur simultaneously or separately, although apparently brought about by the same cause:—

1. A change in the refraction which may be myopic or hyperopic.
2. A diminution in accommodation.
3. Subjective impairment of vision not due to any change in refraction or accommodation, namely an amblyopia of some type.

Myopic changes always occur in the untreated diabetic while hyperopic changes occur only after treatment has begun. The myopia improves rapidly with the treatment of the diabetes, while the hyperopic change appears quite suddenly as soon as the treatment of the diabetes begins, but usually subsides slowly. It takes, at times, a number of weeks before the refraction returns to normal.

Many theories have been suggested as an explanation for the transitory visual disturbances in diabetes. Although in the opinion of most of the investigators the lens is the seat of the refractive changes, it was left to Elschmig,⁸ to bring definite proof of this theory. He reported a case of a woman who had developed diabetes
(*please turn to page eleven*)

FROSH FACTS

by Herbert S. Greenblatt '41

"Pst, don't look now but we're going to have exams this week." Such was the whispered warning among the freshmen just a couple of weeks ago. We had them. I should like to continue further and write much more about all the charming occurrences during that delightful week but my face alternately flushes and pales, my respiration is rapid and alarming, my hands are cold, my brow is hot and my digestion—oh well let's forget my digestion. Anyhow, all these things happen when I but think,—just *think* mind you of what has happened to us. However, during the exams this writer could not help but notice certain obvious actions and mannerisms of his fellow sufferers.

1. The completely blank look on the face of one "Gil" Hindman when he opened his exam notebook and read the list of questions. We're dying to find out if he did as badly as he looked he would.

2. The hurried glances that most freshmen very often took at their timepieces. Very few were through before the 2 hours were up. Those that did pass in their papers early usually *were* "through".

3. Lew Beckwith's casual finish to the "Sike" exam. At the very end Lew was beaming fatherly beams at the group of freshmen chortling below on the "campus." Lew says that although he forgot the different types of idiots all that he needed was a glance around the classroom to refresh his memory.

4. The subdued groans at the beginning of the Theoretic Optics session. They were still groaning at 11.00 A. M.

5. The rapid manner in which the freshmen class dispersed to all corners of the globe after the last exam was messed up. *Society note*—Byrd and Fox go South.

Was Frosh A surprised the other day when in through the open window flut-

tered a small bird. Unable to make head or tail of what Dr. Brucker was saying (can we blame it?) the small feathered flier retired to the corner of the room and after due deliberation selected Goodfader's hat as the most comfortable. Goodfader didn't mind until an unusual (or is it usual) thought flittered through his mind. He jumped up and shooed the bird off just in time to save his honor and his hat. The bird, indignant at such treatment made a bee-line for the nearest window but not before it flicked its tail not only disrespectfully but also disdainfully at the students of the world and particularly at the students of the Massachusetts School of Optometry.

Why is it that Frosh A was so far ahead of B in the number of 100's received in the anatomy exam? Is the inequality due to anatomical, psychological or physiological differences? That just about takes in the whole year's course.

"What is so rare as a day in June?" So spake the ancient bard. However, a more appropriate quotation at the present time would be—"*What is as rare as an 'A' in May?*" Spring weather is again upon us and it is with many a grunt and groan that this, the first freshman class ever to become sophomores turn to our books and notes in a final effort to do ourselves justice. The goal is in sight—here we come!

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THRU THE EDITOR'S EYES

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With Graduation Day on hand we find it pertinent to say a few words regarding the immediate future of those who are about to embark upon what we hope will be a happy and successful career.

As is generally realized, the most critical part of any professional man's life is in the first few years of his practice. If he can properly survive that initiatory period, his success is assured. For most of these men, those years will be financially critical.

However, it is not the financial question which is regarded as the most critical part at this time. The money factor usually takes care of itself if and when the practitioner exerts his efforts in the proper direction. The most important question for the young optometrist is how to properly utilize his excess time. A young fellow rents himself an office and settles down to wait for patients. How is he employing

himself during that time of waiting?

There are some fellows who read everything but that pertaining to their own profession. On their desks one will find all kinds of newspapers and periodicals. Seldom will there be found among that pile of débris a professional journal. These men will have an amazing fund of general information which is all very fine, yet the chances are ten to one that they will know little about the latest developments in their own field, let alone the old ones. They will make that mistake only once. A sinister Nemesis will find them out and expose them when one faulty diagnosis is made with disastrous consequences.

It is a horrible sensation to have to explain to an indignant patient just how that error occurred. Do not think that the maltreated one can be bewildered. He will ask many somewhat pointed questions and will not be satisfied, commonplace creature that he is, with a quotation from Shakespeare or a stanza from the "Lay of the Last Minstrel". When he is gone the unhappy O. D. will mop the sweat from his feverish brow, and that Code he neglected will seem to reprove him audibly for his indolence and carelessness.

The man who can find pleasure in reading, whether it be of a classical nature or material that goes under the designation of "light literature", is far better off than one who does no reading whatsoever. Still, let it be understood that the mere fact one has been graduated from an optometric school and was fortunate enough to pass the State requirements to practice in the given capacity does not mean there is nothing more to be learned in that profession. Continued reading, studying, questioning and prying for hidden information as an augmentation to the foundation acquired at college will inevitably increase the disposition to success, and this we sincerely hope will come to you all.

EYE, EYE, SUH!

by Maury Ossen '38

THOUGHTS WHILE FLIPPING THE X-CYL.—

An aching molar forced us to the sidelines last month. Honestly, for a whole week our diet was extremely rich in Anac-ins . . . a toothectomy put us right back in the lineup. . . Got a big kick out of Arthur March's column—who wouldn't with their name plastered all over it . . . you know, there isn't a sweeter sound to a person's ears than his own name. (Thanks, Arthur) . . . Warner Bros. aren't going to produce that picture after all (due to the same trouble they're having with "Gone With the Wind"—the cast (?)) . . . Some more dynamite on Optometry's doorsteps—probably will hit the stands around July or August . . . a very clever presentation of the history of the lens appeared recently in the "Optometric Weekly"—it was in "Snow White" form (which, by the way, is a nice trade-name for a lens.) . . . The New Jersey Meds. are trying to put a bill through placing all minor professions dealing with the human body under the sole jurisdiction of the medical board—this would, of course, abolish all other boards. The Optometrists via a little pressure were exempted—which definitely proves that the bill is sure to be defeated. . . *More next month.*

EYDITIES IN THE NEWS—

"I have always thought the rainbow beautiful." John Greenleaf Whittier once said with an amused smile, "but they tell me I have never seen it. It's only color to me is yellow." (Probably had yellow jaundice.)

Russ Peters is the first bespectacled ball player to make the infield of a big league team in more than a decade—plays for the Phillies (will have the Rx for you next month.)

About 5% of the population have colored hearing—which is a particular form of

synaesthesia (syn—together; aesthesia—which see) which manifests itself by the appearance, in the mind, of colors whenever certain sounds are heard. Really are variations of shades of greys. In some individuals each tone of the scale is associated with a specific color while in others a certain range is a color.

This month's "*Wisdomism*": Their glances touched like two champagne glasses.

Santonin, a drug gotten from Santonica (which isn't a city), is used in the treatment of round worm (destroys their radii.) These treatments cause disturbance of vision—making everything appear to be yellow or green. Large doses bring on total blindness. The U. S. preparation Sodii Santoninas is used in diseased conditions of the optic nerve.

From "Don Quixote"—"I am persuaded that Dulcineas' eyes must be green emeralds, full and soft, with a rainbow for eyebrows."

The earliest mention in literature of color blindness in that of Tuberville in Transactions of the Royal Society (1684.)

Most of the facts this month have never before been presented in any column (Winchell, O'Hara, March and the whole bunch—*so bah!*)

Atropine was first prepared in 1833.

Aquillon (1567-1617) coined the term "horopter".

Under red glass lettuce grows four times as quickly as under direct sunlight.

Blue-eyed white cats are supposed to be deaf. (And if it isn't true go ahead and sue us.)

Our space is just about used up and so with apologies to Arthur March "*With Ossens of Love*", I remain your SCOPE correspondent who again utters that immortal phrase—*Eye'll be seeing you, but definitely.*

CROSS CYLINDERS IN MODERN REFRACTION

by Philip D. Quinn, O. D.

(concluded)

A good rule to determine which is the most fatigued function is as follows: Take the "add" as found by the X-Cyl., multiply it by the Interpupillary distance in Cms., and compare the product thus found with the amount of induced phoria. Following is an example:

Interpupillary Dist.: 60 mm.

Distance Subj.: Plus .75 Sph O. U.

Unfused X-Cyl.: Plus 2.75 Sph O. U.

(Add plus 2.00)

Induced Phoria: 5 Exo.

6 Cms X 2.00 equals 12

This 12 is higher than the 5 Exo. Therefore the Accommodation finding is higher and hence the more fatigued function.

Of course, this finding and technique are not to be interpreted as all embracing. It is their relation to other findings in the examination that tell us the true story.

Skeffington uses the X-Cyls. another way. When after a complete analytic examination, it has been shown that additional plus is necessary for near we then make use of the binocular fused X-Cyl. test. Technique: Distance Rx is in front of eyes. A pair of X-Cyls. are placed in front of eyes with their plus axes horizontal. A plus .50 Cyl. combined with a minus .50 Cyl. usually suffices. This test is binocular. Direct patient's attention to the cross lines on the target. If horizontal lines stand out clearer, add plus sphere O. U. in sufficient amount to equalize the appearance of the lines. After the lines have been equalized, change the target to one having a Reduced Snellen chart and dissociate the eyes vertically. Exophoria will usually be found. Insert sufficient base in prism from the Rotary Prisms to align the two targets, being sure that the patient is reading the very finest print possible. In the cases requiring bifocals, whether pre-presbyopes or presbyopes there will be found a consider-

able quantity of plus over and above the distant Rx. Of course the full plus is not prescribed until the deduction is made for the accommodative lag. If the induced phoria under this finding is 6 Exo., a .75 lag is deducted; and for each successive 2 degrees of Exo., deduct a scant .37. Further than this, this "add" to be given must bring the "blur-out points" to somewhere around their expecteds. This finding, as well as all the others, under this particular Foundation Technique must be compared with other findings in the examination.

Diagnostic Uses (Jaques): Jaques' technique in the use of X-Cyls. is virtually the same in result as that employed by Skeffington except that the method of approach is slightly different. To get the general slant on Jaques' technique and interpretation it will be necessary to start with the near phoria. A normal pair of eyes looking at 16 inches exert 2.50 D. of Accommodation and 15 P. D. of Convergence. Putting it another way, by virtue of the third nerve innervating both Accommodation and Convergence, when 2.50 Accommodation is exerted, it also induces (theoretically) 15 P. D. Convergence. Conversely when 15 P. D. of Convergence is exerted, it induces 2.50 D. of Accommodation. Practically this is not so. We dissociate the eyes vertically. Use a Reduced Snellen Target. Patient reads very finest print possible. Now, if patient is reading the finest print possible at 16 inches, we know that 2.50 D. of Accommodation are in force. Usually exophoria is shown under this test. The amount found in the normal case according to Jaques is 5 degrees. Now, if there is 5 P. D. of exo. that means that the full amount of convergence (15 P. D.) is not being exerted. To put it another way 2.50 D. Accommodation instead of inducing 15 degrees of Convergence induces only about 10 degrees. This

is the element of "play between functions" that acts as a shock absorber to fatigue. Next the Fused X-Cyl. test is done. We know when we put the X-Cyl. target at 16 inches from the eyes that 15 P. D. Convergence is in force. We then usually find in a normal case that it takes about plus .50 to plus .75 to equalize the lines of the target. In other words, when we force 15 P. D. Convergence, this in turn, instead of inducing a corresponding 2.50 D. of Accommodation, induces only about a 1.75 to 2.00 D. This represents the play in the Accommodative function. To sum up, there is in the normal well balanced case, a slight lag of Accommodation, and a slight lag of Convergence which afford a nice easy play between functions and absorbs any slight fatigue. If there is a large difference in these ratios, there is unequal fatigues and then lenses or orthoptics are in order, provided this tendency is shown in other tests throughout the examination. Next is the Un-Fused X-Cyl. which allows both Convergence and Accommodation to dangle simultaneously and then we compare them both at the same time to see definitely which of the two functions is the most fatigued. This technique is the same as the Unfused X-Cyl. in the Skeffington Technique.

In the use of X-Cylinders there are many things that must be guarded against. We must first be sure that, subjectively, we have done as accurate a refraction as possible. Sometimes the spheres will be equal subjectively and not so under the Unfused X-Cyl. test. Again, subjectively, the spheres may be unequal and with the Unfused X-Cyl they may be equal. Again there may be chromatism of the lines, caused by too much illumination on the targets or toxemias as suggested by Peckham and his associates. Sometimes it is difficult to get the patient to accept the proper cylinders, subjectively, and here we'll have difficulty with the X-Cylinders. We must be on the lookout for all these things to avoid falling into error. There

have been instances when the X-Cyls. didn't work, the vertical lines remaining black under the fused X-Cyl. Test. At least minus lenses should have equalized them, but did not. Theoretically base in prisms should have equalized them, but did not. Peckham had a couple of these cases and upon close investigation these patients showed a hyperphoria which when corrected, he was able to equalize the appearance of the lines on the target. Of course, such cases as these are not of frequent occurrence, but we can, at least be on our guard against them.

Another fact we must bear in mind when doing X-Cyl. tests, is that Accommodation is a two way function. In other words "inhibition" is just as active an act as "stimulation". Also the Accommodative innervation is closely tied up with the sympathetic nervous system. We know that dysfunctions in one part of the sympathetic nervous system affect organs in another remote part of that same nervous system. In other words Accommodation can be affected by the imbalances in visceral organs which no doubt can account for the occasional apparent paradoxical findings with X-Cyls. and Skiametric tests.

In conclusion, I might add that in certain instances I've gone into rather minute detail to explain some of these techniques and interpretations. My sole reason has been a sincere desire to aid the student and clear up some of the fog that seems to enshroud this subject. It is obviously impossible to go into detail on every branch of this subject. For further reference, the student is referred to the bibliography listed below.

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JUNIOR JOTS

by Arthur F. March, Jr. '39

At last the poet laureate of the class of '39 has disclosed himself. Harvey Rosenthal, inspired by Dr. Greene's lecture, sat down and dashed off the following:

ODE TO A CLINICIAN

Listen my children and you shall hear,
Of the use of dynamic ski at near;
Behind the little black disc you go,
And watch the shadows move to and fro.

Drilled in our skulls, the facts are these,
Accommodation we must tease,
As low and high N. P.'s we find,
Convergence points are kept in mind.

According to Cross, Sheard and Treleaven,
True emmetropes are found in heaven.
We're sure the saints above won't take
Our retinoscope at the pearly gate.

And while we're still in this poetic mood,
here's the latest optometrist's theme song:
"It's wonderful—to look into your eyes."

It seems that Charlie McCarthy's friend, Edgar Bergen, is something of an optometrist on the side, and he must be pretty good. He can do a refraction with an ophthalmoscope, according to an episode in "The Story of Charlie McCarthy" on sale at the five and dime. (That gives you a pretty good idea of the heavy reading we do during vacation.)

Something to worry about for the next Path exam: Headache can result from more than 200 different mental and physical disorders, and dizziness can be brought on by at least 100 different kinds of illnesses, not including pre-exam fever. No wonder the aspirin business is so good.

Wayman Peterson and yours truly are running neck and neck for the honor of being the class moron. We both studied

Physiological Optics for all we were worth the night before the Theoretic exam, and maybe it wasn't a shock when they passed the exam papers out. Some people seem to think there is a certain amount of humor in that but we definitely fail to see it.

Maybe there's something in this auto-suggestion business. Weinberg is suffering from an attack of parotitis (mumps, to you) and all during Dr. Spritz's lecture on the subject he thought that peculiar feeling in his jaw was just imagination.

The moustache rage is on again, with Rinn, Ochab, Hathaway, Salerno and Schiano cultivating that professional atmosphere. Guess it must be spring and that well-known urge to grow.

Thought for the month: Social success is an infinite capacity for being bored.

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-- REFRACTIVE CHANGES

(continued from page four)

with visual disturbances at the time when she had only one lens, the other having been removed because of a cataract. A change in the refraction was found only in the eye with the remaining lens. It is thus clear that the refractive changes are due to changes in the lens. As to the disturbance of accommodation, Granstöm believes that it is due to a change in the refractive index of the central part of the lens, while many other writers attribute it to a paresis of the ciliary muscle.

Since a number of patients who are over forty have had visual disturbances without noticeable change in the refraction, this disturbance cannot be blamed to a paresis of accommodation but to a third factor which lies somewhere outside of the lens, and of the mechanism of accommodation. Assuming that the lens or some other part of the eye undergo changes, what causes these changes? Hagen⁹ believes that it is the diet, while Enroth¹⁰ and Post¹¹ think that the acidosis is responsible. The most widely accepted theory at present is that of Duke-Elder,¹² who attributes the transitory change in refraction to swelling of the lens in myopia. The changes depend on and vary with the sugar concentration in the blood, and presumably in the aqueous humor. He states that with a high blood sugar the sodium chloride content of the blood drops, and he therefore believes that the salt content is also lowered in the tissue and in the aqueous. The lens, which has a sluggish metabolism, resists this osmotic disturbance for a while, but the water fairly suddenly enters the lens, causes it to swell and myopia develops. With the drop of the blood sugar the reverse occurs, namely, hyperopia develops because water escapes from the lens into the surrounding fluid, which has, at that time, a relatively low osmotic pressure.

Duke-Elder admits that his theory does not explain why this phenomenon is only

observed in some cases of diabetes but not in others. Marked changes in the blood sugar can be found in any stage of diabetes under treatment without any influence on the refraction or accommodation.

In cases of transitory refractive changes, particularly those due to diabetes, the eyesight may at times become very defective. However, because of the transitory nature of these defects, glasses should not be prescribed or changed until the refraction has become stabilized. Sudden changes in vision and especially in the refraction of an individual should warrant a thorough examination in order to eliminate pathology in the eye or in some other organ of the body.

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Why not invest your money now in a brand-new test lens set that can be built up later at little additional expense? The AO Students' Test Lens Set is adequate for school requirements and adaptable to your future needs as a practitioner. The set includes all necessary lenses and regular accessories. It is beautifully made, and packed in a travelling-style case complete with mahogany tray. The price has purposely been kept as low as possible. An AO Representative will gladly show it to you on request.



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